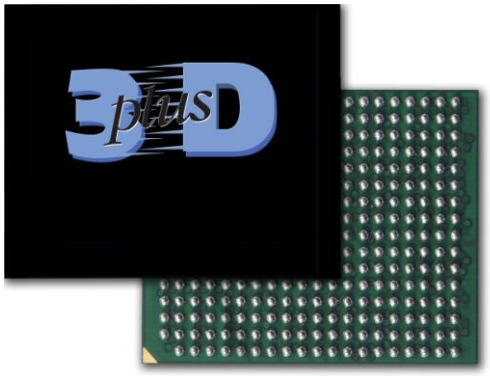
16GB µSSD MEMORY MODULE
3DSS128G16VB2434
PATA / CF / PCMCIA interface

Features

- Storage Capacity: 16 GBytes
- ATA/IDE, PCMCIA 2.1 and CF 4.1 standard compatible
- Supports up to PIO Mode-6
- Supports up to Multi-Word DMA Mode-4
- Supports up to Ultra DMA mode-4
- Endurance : 2 millions W/E
- Hardware ECC : 4 Bytes in a 512 bytes sector
- Wear levelling
- Bad block management
- Flash Single-level cell technology :
  - Data retention : 10 years
  - Endurance : 100,000 W/E
- Data transfer to flash
  - Sustained read : 40 MB/s
  - Sustained write : 35 MB/s
- Power down data protection
- Flash write protect control
- SLC Nand Flash Technology
- 5V or 3.3Vsingle power supply
- 224 PBGA, pitch 1.27mm
- Operating temperature:
  - 0°C to +70°C
  - -40°C to +85°C
  - -55°C to +125°C
- Storage temperature:
  - -65°C to +150°C



- Size: 22 x 26 mm
- Height: 3.7 mm
- Mass: 4.4gr +/- 0,05

Application

- Mass storage solution for industrial products

General Description

The 3DSS128G16VB2434 is a high-density, high-performance, fully integrated, embedded flash Solid State Drive. It combines a Controller and two SLC Nand Flash integrated in a compact BGA package. This product is tolerant to shocks and supports industrial temperature for applications requiring high reliability.

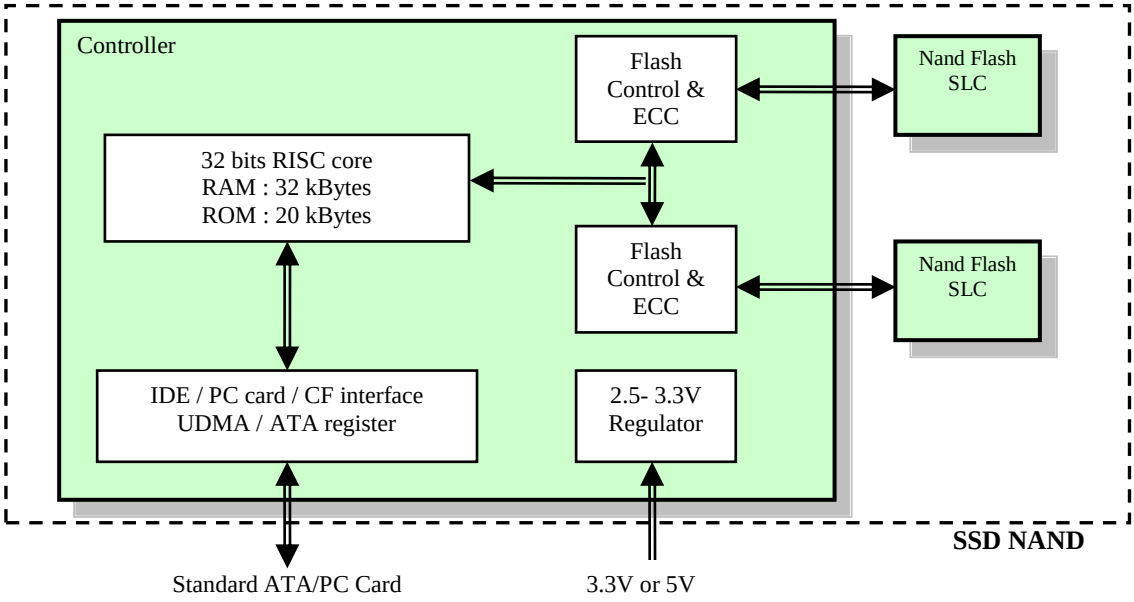
The endurance of the SLC FLASH is extended with controller functions of wear levelling, bad block management and hardware error correction.

This product is fully compatible with the standard ATA/IDE, PCMCIA 2.1 and CF 4.1. Operation Modes supported are PC Card Memory Mode, PC Card IO Mode and True IDE Mode.

Bypass capacitors and pull-up resistors are integrated inside the package, only few external components are required for a typical CF or IDE application.

Thanks to the high density patented technology the memories are embedded in a small form factor package without compromising electrical or thermal performance. The 3DSS128G16VB2434 is packaged in a BGA 224 and available in commercial, industrial and military temperature range.

Bloc Diagram



BGA Pin Configuration

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A		NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
B	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
D	NC	NC	NC	GND	GND	IOIS16# / WP	IORDY / WAIT#	DMACK# / REG#	CSEL#	DIAG# / STSCHG#	GND	GND	NC	NC	NC
E	NC	NC	NC	GND	DASP# / SPKR#	DMARQ / INPACK#	WE#	CS1# / CE2#	CS0# / CE1#	IORD#	D0	GND	NC	NC	NC
F	NC	NC	NC	VCC	NC	INTRQ / IREQ#	IOWR#	SELATA# / OE#	D8	D14	D9	D10	NC	NC	NC
G	NC	NC	NC	VCC	VCC	NC	GND	GND	GND	GND	D1	D15	NC	NC	NC
H	NC	NC	NC	VCC	NC	HRESET#	GND	GND	GND	D7	D4	VCC	NC	NC	NC
J	NC	NC	NC	RESET#	NC	GND	GND	GND	VCC	D12	VCC	VCC	NC	NC	NC
K	NC	NC	NC	NC	A3	A2	A5	A10	D5	D3	D11	VCC	NC	NC	NC
L	NC	NC	NC	GND	A0	A1	A6	A9	D6	D13	EXT_IO	GND	NC	NC	NC
M	NC	NC	NC	GND	GND	A4	A7	A8	VCC	D2	GND	GND	NC	NC	NC
N	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
P	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
R	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Signal Description

Signal Name	*Status**	*Description*
CS1#/CE2#	I/PU	True-IDE: Address range select for task file PC Card: Card Enable 1
CSO#/CE1#	I/PU	True-IDE: Select Alternate Status and Device Control Registers. PC Card: Card Enable 2
DMACK#/REG#	I	DMA Acknowledge when DMA is activated Register Select
WE#	I/PU	True-IDE: Not used. Should be connected to VCC PC Card: Memory Write Enable,
SELATA#/OE#	I/PU	True-IDE: Should be connected to ground PC Card: Output Enable
IOWR#	I/PU	I/O Write Enable. STOP when DMA is activated
IORD#	I/PU	I/O Read Enable. HSTROBE when DMA is activated
CSEL#	I/pu	True-IDE: Cable Select. Grounded for master, Open for slave PC Card: Not used, should be connected to A25 or grounded
RESET#	I	True-IDE: Reset active low signal PC Card: Reset active high signal
A10..A0	I	Address Bus. In True IDE, only A2, A1, A0 are used. The remaining address lines could be left unconnected
D15..D0	I/O	Data Bus
IOIS16#/WP	O	16-bit I/O Transfer PC Card memory mode: Write Protect
DMARQ/INPACK#	O	True-IDE: DMA Request PC Card: Input Acknowledge
INTRQ/IREQ#	O	True IDE: Interrupt Request, active high PC Card : Interrupt Request, active low
DIAG#/STSCHG#	I/O/PU	True-IDE: Pass Diagnostics PC Card: Status Change
DASP#/SPKR#	I/O/PU	True-IDE Drive Active Present PC Card: Speaker
IORDY/WAIT#	I/O/PU	True-IDE: I/O Ready. DDMARDY when DMA is activated PC Card: Wait Signal
EXT_IO	PU	External I/O. Reserved for specific or future use. Could be left unconnected
HRESET#	I/PU	Hardware Reset signal of the controller. Could be left not connected.
GND		Host ground connection
VCC		Host supply connection. +5V or +3.3V

** I: input, O:Output, PU:PullUp*

Capacity specification

The spare area holds the manufacturer defect blocks. The other blocks in the spare area are used as spare blocks for defect block re-mapping for flash memory blocks that turn bad during the life of the card.

Capacity	*Cylinders*	*Heads*	*Sectors/Track*
16 GBytes	32462	16	63

3D Plus SA reserves the right to cancel product or specifications without notice

Absolute Maximum Ratings

Operation beyond the following limits may cause module degradation, reliability reduction or permanent damage.

Parameter	*Conditions*	*Min*	*Typ*	*Max*	*Unit*
Voltage on any pin	Continuous	-0.5		Vcc+0.5	V
Storage Temperature	-	-65		+150	°C

DC Parameters

Supply Voltage Vcc=5V +/- 0.5V or 3.3V +/- 0.3V

For proper operation, the module should be used within the recommended operating conditions.

Parameter	*Symbol*	*Conditions*	*Min*	*Typ*	*Max*	*Unit*
Input Low voltage	Vil		-0.3		+0.8	V
Input High Voltage	Vih		2		Vcc+0.3	V
Output Low Voltage	Vol	At 4mA (12mA for DASP)			0.45	V
Output High Voltage	Voh	At 1mA	2.4			V
Stand By Current	Isb				1.6	mA
Operating Current	Icc	Read/Write/Erase		140	170	mA
Input Output Capacitance	Cio				10	pF
Operating Temperature commercial	Ta com	Supply Voltage 3.3V	0		+70	°C
Operating Temperature industrial	Ta ind	Supply Voltage 3.3V	-40		+85	°C
Operating Temperature military	Ta mil	Supply Voltage 3.3V	-55		+125	°C

Typical series termination for Ultra DMA

Series termination resistors are required at both the host and the card for operation in any of the Ultra DMA modes. Only signals requiring termination are listed in this table. If a signal is not listed, series termination is not required in an Ultra DMA mode. The actual termination values should be selected to compensate for transceiver and trace impedance to match the characteristics cable impedance.

Signal	*Host termination*	*Device Termination*
IORD#	22 ohm	82 ohm
IOWR#	22 ohm	82 ohm
CSO#, CS1#	33 ohm	82 ohm
A0, A1, A2	33 ohm	82 ohm
DMACK#	22 ohm	82 ohm
D15..D0	33 ohm	33 ohm
DMARQ	82 ohm	22 ohm
INTRQ	82 ohm	22 ohm
IORDY	82 ohm	22 ohm
RESET#	33 ohm	82 ohm

Performance

Parameter	*Conditions*	*Typical*
Host data transfert	PIO mode 6 or MDMA mode 4 UDMA mode 4	25 MBytes/s 66 MBytes/s
Sustained Flash data transfert	Read Write	40 MBytes/s 35 MBytes/s

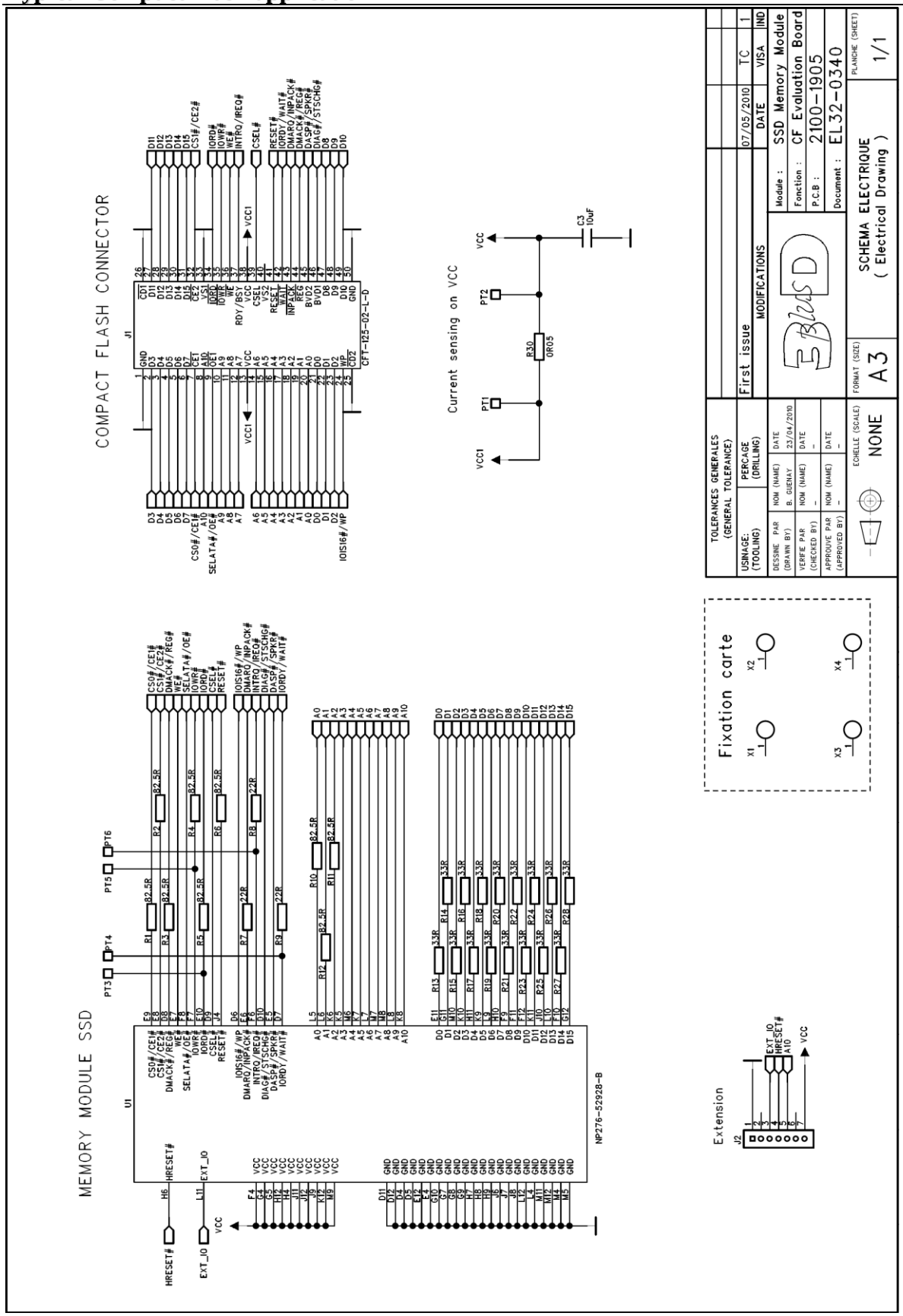
Environmental Specification

Parameter	*Conditions*	*Remarks*
Thermal Cycles	Mil-std-883 Method 1010 Condition B JESD22-A104D Condition B	500 Cycles, -55°C/125°C
High Temperature Storage	Mil-std-883 Method 1008 JESD22-A103C Condition A	1000hrs, 125°C
Humidity	JESD22-A101	85%HR / +85°c

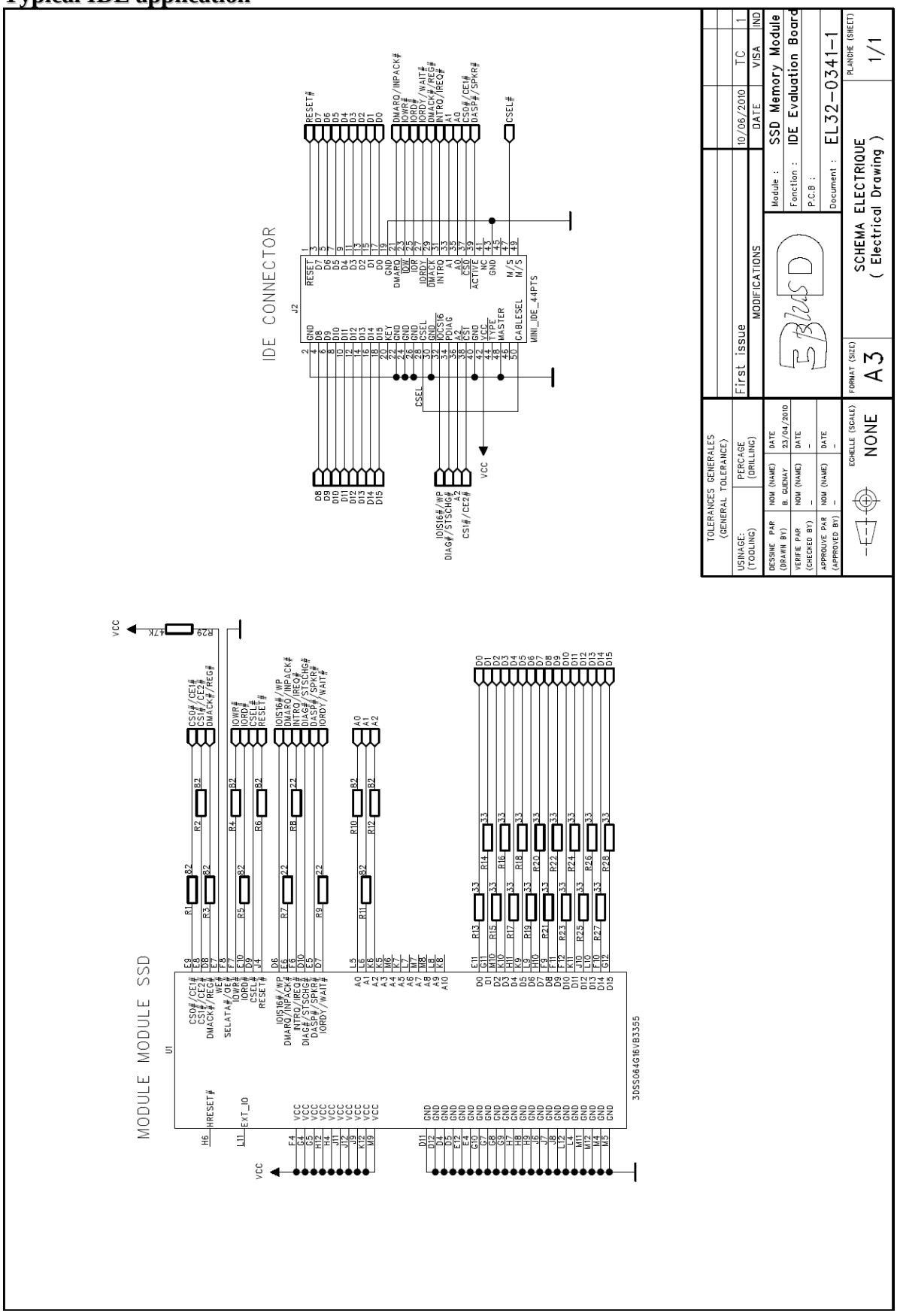
Reference

Revision	*Name*	*Link*
11/2008	Hyperstone F4 32-bit Flash Memory Controller User's Manual	http://www.hyperstone.com/fmc_f4_en.html
02/2000	Information Technology -AT Attachment with Packet Interface - 5(ATA/ATAPI-5)	http://www.t13.org/Documents/UploadedDocuments/project/d1321r3-ATA-ATAPI-5.pdf

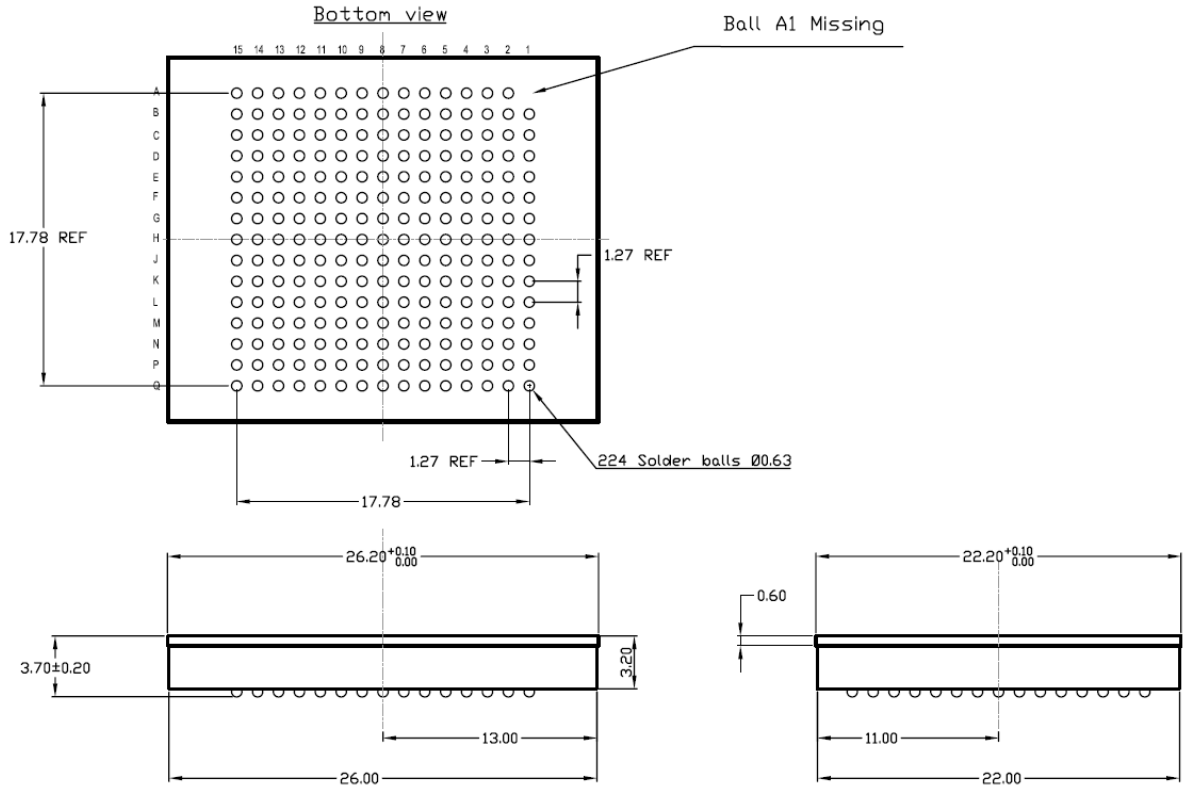
Typical Compact Flash application



Typical IDE application



Module Mechanical Drawing



Notes

1. Dimensions are in mm
2. Solder Balls, SAC 305, Eutectic 221°c

Part Number / Ordering Information

3DSS128G16VB2434-X

Temperature Range

C : 0°C /+70°C
I : -40°C/+ 85°C
M: -55°C/+125°C

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